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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,348	09/19/2007	Gerhard Schanz	3575	4387

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EXAMINER	
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ART UNIT	PAPER NUMBER
1797	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/563,348	SCHANZ ET AL.	
	Examiner	Art Unit	
	Andrew Janca	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *18-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-23* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 18-23 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 3/12/2009.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0039169 A1 to Ehrfeld et al.

6. With regard to claim 1, Ehrfeld et al teach a component for a static micromixer (figure 3a) in the form of a disk (2a) which has at least one inlet opening (4b) for the introduction of at least one feed stream into a linking channel (31) disposed in the plane of the disk and at least one outlet opening (34) for the outflow of the feed stream into a mixing zone (7) disposed in the plane of the disk, wherein the inlet opening (4b) is connected with the outlet opening (34) in a communicating manner through the linking channel (31) disposed in the plane of the disk, and wherein the linking channel (31) before opening into the mixing zone (7) is divided by microstructure units, the unnumbered raised portions between part channels 32, into two or more part channels (32, 33, 34), the widths of the part channels being smaller than the width of the mixing zone (7) (figure 3a, para 51). Ehrfeld et al does not explicitly teach that the widths of the part channels be in the millimeter to submillimeter range: however, it would have been obvious to one of ordinary skill in the art to manufacture the disk of Ehrfeld et al so that all its channels be of millimeter to submillimeter range: the motivation would have been the teaching by Ehrfeld et al that they disclose a “Micromixer”, as their invention is titled. Alternatively, it has been held that where the only difference between a claimed invention and the prior art was a recitation of relative dimensions of the claimed device, and a device having the claimed relative dimensions would not perform differently than

the prior art device, the claimed device is not patentably distinct from the prior art device. See *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984).

7. With regard to claim 2, that the widths of the part channels (34) at their opening into the mixing zone may be on the micrometer to millimeter scale and hence lie within the range 1 µm to 2 mm, is obvious over Ehrfeld et al for the reasons given with regard to claim 1 above.

8. The additional elements of claim 3, including that the ratio of the greatest width of the linking channel (31) and/or of the width of the inlet opening (4b) to the width of the part channels (34) is greater than 2, are obvious over Ehrfeld et al (figure 3a).

9. The additional elements of claim 4, including that the ratio of the length to the width of the part channels (33) is from 1:1 to 20:1, are taught by Ehrfeld et al (figure 3a).

10. The additional elements of claim 5, including that the ratio of the width of the mixing zone (7) to the width of the part channels (33) is greater than 2, are taught by Ehrfeld et al (figure 3a).

11. The additional elements of claim 6, including that additionally the disk has at least one flow-through opening, one of (4a, 4b), are taught by Ehrfeld et al (para 51).

12. The additional elements of claim 7, including that at least one of the inlet openings (4b) or flow-through openings (4a, 4b) or the mixing zone (7) is enclosed by the plane of the disk and that the linking channel (31) is formed by an indentation, are taught by Ehrfeld et al (paras 30, 51).

13. The additional elements of claim 8, including that at least one of the inlet openings (4b) or flow-through openings (4a, 4b) is disposed at the edge of the disk or as a recess at the edge of the disk, are taught by Ehrfeld et al (figure 3a).

14. The additional elements of claim 9, including that there are present at least two inlet openings (4b) for at least two different feed streams, each inlet opening (4b) being connected with the mixing zone (7) through the linking channel (31), are taught by Ehrfeld et al (figure 3a).

15. The additional elements of claim 10, including that there are present two inlet openings (4b) for two different feed streams, each inlet opening (4b) being connected with the mixing zone (7) through one linking channel (31) and the outlet openings (34) of the two linking channels (31) being disposed opposite one another, are taught by Ehrfeld et al (figure 3a).

16. The additional elements of claim 11, including that the outlet openings (34) are arranged on a circular line, are taught by Ehrfeld et al (figure 3a).

17. The additional elements of claim 12, including additional through-holes (4b) and additional part channels (32, 33, 34) the latter being integrated into the microstructure units (identified regarding claim 1 above) and being separated from the part channels (32, 33, 34), are taught by Ehrfeld et al: there are in all four separate sets of inlet channel (4b)-part channel (32-33-34)-outlet (34) channel systems on the disk of Ehrfeld et al (figure 3a).

18. With regard to claim 13, Ehrfeld et al teach a static micromixer (para 1, claim 15) which has a housing (para 26) at least two disks (2a, 2b) as defined in claim 1 (claim

15) arranged into a stack in the housing (claim 15, para 52), wherein the disks are superposed on one another so that the inlet openings (4b) form subsidiary channels for introducing a particular feed stream and the mixing zones (7) form a main channel for removing the product stream, and the main and subsidiary channels extend through the stack (paras 12, 32, 52). Ehrfeld does not explicitly teach that the housing should have at least 2 fluid inlets and at least one fluid outlet. However, it would have been obvious to one of ordinary skill in the art to provide two fluid inlets: the motivation would have been to supply the at least two fluids to be mixed from the at least two reservoirs taught by Ehrfeld et al (para 15); and at least one outlet: the motivation would have been because Ehrfeld et al teach their apparatus to be a micromixer (para 1), not a container for fluids.

19. The additional elements of claim 14, including that the linking channels (31) of the disks (2a, 2b) are formed by indentations (para 30) and that the linking channels (31), before opening into the mixing zone (7), are divided into part channels (32, 33, 34) by the microstructure units provided on the disk, are taught by Ehrfeld et al.

20. The additional elements of claim 15, including that the linking channels (31) of the disks (2a, 2b) are formed by recesses in the disks (para 30), the disks (2a, 2b) being arranged as intermediate disks between a cover disk and a bottom disk (para 20: there may be more than three disks, that is at least four: one on the top of the stack, one on the bottom, and two in between), and that the linking channels (31) before opening into the mixing zone (7) are divided into part channels (32, 33, 34) by microstructure units,

the unnumbered raised portions between part channels 32, provided on the cover disks and/or bottom disks, are taught by Ehrfeld et al (figure 3a, paras 51-55, claim 15).

21. With regard to claim 17, Ehrfeld et al teach a combustion reactor having a micromixer with at least one component as defined in claim 1 (Ehrfeld et al claim 15). Ehrfeld et al do not explicitly teach that the reactor should have at least one connection for introducing a combustible liquid or gaseous medium, and at least one second connection for introducing a combustion reaction-promoting medium. However, it would have been obvious to one of ordinary skill in the art to provide two fluid inlets, which could be used for a combustible liquid or gaseous medium, and a combustion reaction-promoting medium: the motivation would have been to supply the at least two fluids to be blended from the at least two reservoirs taught by Ehrfeld et al (para 15). The limitations that the fluids to be blended be a combustible liquid or gaseous medium and a combustion reaction-promoting medium are statements of intended use. It has been held that "[e]xpressions relating the apparatus contents thereof during an intended use operation are of no significance in determining the patentability of the apparatus claim." See *Ex parte Thilbault*, 164 USPQ 666, 667 (Bd. App. 1969).

22. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ehrfeld et al in view of US 4,516,632 to Swift et al. Ehrfeld et al do not explicitly teach that their micromixer include an integrated heat exchanger. However, Swift et al teach a micromixer comprised of stacked plates with intercommunicating channels (figure 8), and further teach that the apparatus may be used as a heat exchanger between two fluids flowing through (1:66-2:26). At the time the invention was made, it would have

been obvious to one of ordinary skill in the art to integrate a heat exchanger into the stacked micromixer of Ehrfeld et al, by providing two fluid flow systems through the plates as do Swift et al: the motivation would have been to provide a heat exchanger under conditions where the total volume of liquid may be very small (Swift et al 1:29-31).

23. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ehrfeld et al, as evidenced by US 3,856,270 to Hemker. Hemker teaches that a static micromixer of stacked plates communicating a single fluid such as that of Ehrfeld et al (Hemker figures 1-4) may itself be used as a heat exchanger (Hemker 2:55-69). It would have been obvious to one of ordinary skill in the art to use the micromixer of Ehrfeld et al as a heat exchanger, as does Hemker: the motivation to do so would be because mixing the heat exchange fluid enhances heat exchange (Hemker 2:58-61).

Double Patenting

24. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29

USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

25. Claims 1-17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 20-30 and 49 of copending Application No. 10/563,191. Although the conflicting claims are not identical, they are not patentably distinct from each other because each describes static micromixers having disks with at least one inlet opening for the introduction of at least one feed stream into a linking channel disposed in the plane of the disk and at least one outlet opening for the outflow of the feed stream into a mixing zone, where the inlet opening is connected with the outlet opening in a communicating manner through the linking channel disposed in the plane of the disk, and where the linking channel before opening into the mixing zone is divided by microstructure units into two or more part

channels, the widths of the part channels being in the millimeter to submillimeter range and being smaller than the width of the mixing zone; with particular ratios between the channels; with additional flow-through openings, connected inlet openings, and integrated part channels; with the outlet openings arranged in a circular line; the channels formed as recesses in the disks; where the disks may be stacked, and incorporated into a micromixer or reactor with a housing with at least two fluid sources.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

26. Claims 1-17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-19 of copending Application No. 10/563,354. Although the conflicting claims are not identical, they are not patentably distinct from each other because each describes static micromixers having disks with at least one inlet opening for the introduction of at least one feed stream into a linking channel disposed in the plane of the disk and at least one outlet opening for the outflow of the feed stream into a mixing zone, where the inlet opening is connected with the outlet opening in a communicating manner through the linking channel disposed in the plane of the disk, and where the linking channel before opening into the mixing zone is divided by microstructure units into two or more part channels, the widths of the part channels being in the millimeter to submillimeter range and being smaller than the width of the mixing zone; with particular ratios between the channels; with additional flow-through openings, connected inlet openings, and integrated part channels; with the outlet openings arranged in a circular line; the

channels formed as recesses in the disks; where the disks may be stacked, and incorporated into a micromixer or reactor with a housing with at least two fluid sources.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Janca whose telephone number is (571) 270-5550. The examiner can normally be reached on M-Th 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AJJ

/DAVID L. SORKIN/
Primary Examiner, Art Unit 1797